

WHAT IS CLAIMED IS:

1. An apparatus for analyzing a plurality of samples in sample sites on a substrate, the apparatus comprising:

5 a) an array of spaced apart light sources coupled to a moveable support so that one or more of the light sources can be selectively used;

b) a frame for supporting the substrate;

c) a detector configured to detect light;

10 d) an optical relay configured to transmit light from at least one of the light sources to one of the plurality of sample sites and from the sample site to the detector; and

e) a support structure for supporting the frame, the
15 detector and the optical relay.

2. The apparatus of claim 1 further comprising a selection switch coupled to the moveable support.

20 3. The apparatus of claim 1 wherein the frame is configured to move the substrate in a first direction so that the sample sites pass sequentially through an examination region.

25 4. The apparatus of claim 1 wherein the moveable support is a rotatable wheel.

5. The apparatus of claim 1 wherein the moveable support further comprises an aperture for the passage of
30 light from a light source not positioned on the wheel.

6. The apparatus of claim 5 wherein the exterior light source is a deuterium lamp.

7. The apparatus of claim 1 wherein the array of
5 light sources further comprises at least one LED lamp.

8. The apparatus of claim 1 wherein the array of light sources further comprises a plurality of LED lamps, each of the plurality of LED lamps emitting light at a
10 wavelength different than the others of the plurality of LED lamps.

9. The apparatus of claim 1 wherein the array of light sources further comprises:

15 an LED lamp having a wavelength range from about 450nm to about 705nm; and

an LED lamp having a wavelength centered at about one of 370, 430, 470, 590, 620, 910 and 960nm.

20 10. An apparatus for analyzing a plurality of samples in sample sites on a substrate, the apparatus comprising:

a) an array of spaced apart light sources coupled to a moveable support so that one or more of the light sources can be selectively used;

25 b) a frame for supporting the substrate;

c) a detector configured to detect light;

d) an optical relay configured to transmit light from at least one light source to one of the sample sites on the substrate and from the sample site to the detector; and

30 e) a support structure for supporting the stage, the detector and the optical relay;

wherein the optical relay further comprises a beam splitter for splitting light from at least one of the array of light sources into two beams, a first beam being directed to an upper surface of the sample site, and a
5 second beam directed to a lower surface of the sample site.

11. The apparatus of claim 10 wherein the second beam is directed to a lower surface of the sample site by a fiber optic cable.
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12. The apparatus of claim 10 wherein the second beam is directed to a lower surface of the sample site by a liquid waveguide.

13. The apparatus of claim 10 wherein the optical relay further comprises a first shutter selectively moveable to prevent light from the beam splitter from reaching the upper surface of the sample site.
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14. The apparatus of claim 13 wherein the optical relay further comprises a second shutter selectively moveable to prevent light from the beam splitter from reaching the lower surface of the sample site.
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15. The apparatus of claim 14 wherein the first and second shutter further comprise anodized steel.
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16. The apparatus of claim 10 wherein the optical relay further comprises at least one of a first shutter selectively moveable to prevent light from the beam
30 splitter from reaching the upper surface of the sample site and a second shutter selectively moveable to prevent light

from the beam splitter from reaching the lower surface of the sample site.

17. An apparatus for analyzing a plurality of samples
5 in sample sites on a substrate, the apparatus comprising:

a) an array of spaced apart light sources coupled to a moveable support so that one or more of the light sources can be selectively used;

b) a frame for supporting the substrate;

10 c) a detector configured to detect light;

d) an optical relay configured to transmit light from at least one light source to one of the sample sites on the substrate and from the sample site to the detector; and

e) a support structure for supporting the stage, the
15 detector and the optical relay;

wherein the optical relay further comprises:

a beam splitter for splitting light from at least one of the array of light sources into two beams, a first beam being directed to an upper surface of the
20 sample site, and a second beam directed to a lower surface of the sample site; and

a means for blocking at least one of the first beam and the second beam.

18. A method for analyzing a sample, comprising:
25 selecting the apparatus of claim 1;
placing a sample at the sample site on the substrate;
selecting a light source; and
detecting emission light from the sample.

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19. An apparatus for analyzing a plurality of samples in sample sites on a substrate, the apparatus comprising:

5 a) an array of spaced apart light sources coupled to a rotatable wheel so that one or more of the light sources can be selectively used;

b) a frame for supporting the substrate;

c) a detector configured to detect light;

10 d) an optical relay configured to transmit light from at least one light source to one of the sample sites on the substrate and from the sample site to the detector, the optical relay further comprising:

15 a beam splitter for splitting light from at least one of the array of light sources into two beams, a first beam being directed to an upper surface of the sample site, and a second beam directed to a lower surface of the sample site; and

a first shutter selectively moveable to block the first beam; and

20 a second shutter selectively moveable to block the second beam; and

e) a support structure for supporting the stage, the detector and the optical relay; and

wherein at least one of the light sources is an LED.

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